

Control of stripe rust of spring wheat with foliar fungicides, 2008.

The study was conducted in a field with Palous silt loam under natural infection of stripe rust near Pullman, WA. Urea (46-0-0) was applied at 60 lb/A at the time of cultivation. Susceptible 'Lemhi' spring wheat was seeded in rows spaced 14 in. apart at 60 lb/A (97% germination rate) with a drill planter on 22 Apr 08. Harmony Extra 0.33 oz plus Buctril 0.75 pt/A with Agridex crop oil concentrate (COC) at 1% of spray volume was applied on 30 May when wheat plants were at tillering stage. Before the first fungicide application, the field was divided into individual plots of 5 ft (4 rows) in width and 15.5-17.9 ft in length by cutting plants between plots with a rototiller. Fungicides were applied in 16 gal water/A on different dates and stages depending upon the treatments. The first applications of Topguard for the two-application treatments were done on 12 Jun at late jointing stage when there was no sign of stripe rust in plots. The single applications of Topguard, Headline, BAS 556, Quilt, and Stratego and second application of Topguard were done on 25 Jun when plants were at early boot stage and stripe rust just appeared in the plots. A 601C backpack sprayer was used with a CO₂ pressurized spray boom at 18 psi having three operating nozzles spaced 19 in apart. A randomized block design was used with four replications. Rust severity (percentage of diseased foliage on whole plot) was assessed in each plot on 25 Jun just before the second fungicide application and 2 Jul, 7 Jul, 15 Jul, 23 Jul, and 31 Jul or 7, 12, 20, 28, and 36 days after the second fungicide spray, respectively. Plots were harvested on 1 Sep when kernels were naturally dry, and test weight of kernels was measured for each plot. Area under disease progress curve (AUDPC) was calculated for each plot using the six sets of severity data. Relative AUDPC was calculated as percent of the non-treated control. Rust severity, relative AUDPC, test weight, and yield data were subjected to analysis of variance and means were separated by Fisher's protected LSD test.

All fungicide treatments significantly reduced rust severity 7 days after the second application in the field. Differences in rust severity between the treatments and non-treated control remained significant thereafter. Relative AUDPC values of all treatments were significantly lower than the non-treated control, but varied significantly (0.4-14.2%) among the treatments. All treatments significantly increased grain test weight and the increases ranged from 0.99 to 1.52 lb/bu. All treatments significantly increased grain yield by 14.9 (Stratego at 10 fl oz/A) to 24.2% (two applications of Topguard at 14 fl oz/A).

Cultivar, treatment, rate/A, and timing of application ^x	Stripe rust severity (%) ^z						Relative AUDPC ^w	Test weight ^y (lb/bu)	Yield ^y	
	25 Jun	2 Jul	7 Jul	15 Jul	23 Jul	31 Jul			Mean (bu/A)	Increase (%)
	E. B.	E. F.	L. F.	Milk	S. D.	Dough				
Non-treated control...	1.0 a ^v	17.5 a	52.5 a	92.5 a	100.0 a	100.0 a	100.0 a	57.2 b	54.1 d	0.0
Topguard 1.04SC 7 fl oz/A (late jointing- 12 Jun) + Topguard 1.04SC 7 fl oz/A (early boot-25 Jun)...	1.0 a	0.0 b	0.0 c	1.3 c	6.8 c	37.5 b	9.1 bc	58.2 a	65.1 abc	20.4
Topguard 1.04SC 10 fl oz/A (late jointing-12 Jun) + Topguard 1.04SC 10 fl oz/A (early boot- 25 Jun).....	1.0 a	0.0 b	0.0 c	0.5 c	3.0 cd	25.0 bcde	5.5 cd	58.5 a	67.1 a	24.1
Topguard 1.04SC 14 fl oz/A (late jointing-12 Jun) + Topguard 1.04SC 14 fl oz/A (early boot- 25 Jun).....	1.0 a	0.0 b	0.0 c	0.3 c	1.8 cd	26.5 bcd	5.3 cd	58.7 a	67.1 a	24.1
Topguard 1.04SC 14 fl oz/A (early boot- 25 Jun).....	1.0 a	0.0 b	0.0 c	0.5 c	0.8 cd	23.8 bcdef	4.5 cd	58.4 a	66.3 ab	22.6
Headline 2.09EC 6 fl oz/A (early boot-25 Jun).....	1.0 a	0.8 b	3.3 b	10.0 b	13.8 b	30.0 bc	14.2 b	58.6 a	62.6 bc	15.7
BAS 556 01 1.75EC 7 fl oz/A (early boot-25 Jun).....	1.0 a	1.3 b	0.0 c	0.8 c	2.0 cd	6.5 def	2.5 d	58.2 a	63.9 abc	18.2

BAS 556 01 1.75EC 9 fl oz/A (early boot-25 Jun).....	1.0 a	0.0 b	0.0 c	0.3 c	0.8 cd	9.3 cdef	2.0 d	58.6 a	65.8 abc	21.7
Quilt 1.66SC 10.5 fl oz (early boot-25 Jun).....	1.0 a	0.0 b	0.0 c	0.0 c	0.0 d	0.8 f	0.3 d	58.7 a	64.1 abc	18.5
Quilt 1.66SC 14 fl oz (early boot-25 Jun).....	1.0 a	0.0 b	0.0 c	0.0 c	0.0 d	2.0 ef	0.5 d	58.4 a	64.3 abc	19.0
Stratego 2.08EC 7 fl oz/A (early boot-25 Jun).....	1.0 a	0.0 b	0.0 c	0.0 c	0.3 d	12.5 cdef	2.3 d	58.5 a	64.5 abc	19.3
Stratego 2.08EC 10 fl oz/A (early boot- 25 Jun)	1.0 a	0.0 b	0.0 c	0.0 c	0.0 d	1.8 f	0.4 d	58.3 a	62.1 c	14.9
LSD ($P \leq 0.05$) ...	0.0	2.3	2.8	3.6	6.1	23.1	6.4	0.9	4.0	

^z Stripe rust severity was recorded as percentage of leaf area with disease. For the plant growth stages, E. B. = early boot; E. F. = early flowering; L. F. = late flowering; and S. D. = soft dough.

^y Test weight (lb/bu) and yield (lb/A) based on 3-5% moisture measured for each plot.

^x Crop Oil Concentrate (COC) at 1% v/v was applied in treatments of Headline, Quilt, and Stratego.

^w AUDPC is area under disease progress curve, = $\sum[\text{rust severity (i)} + \text{rust severity (i+1)}]/2 \times \text{days}$. Relative AUDPC was calculated for each treatment as the percent of the AUDPC (as 100%) of the non-treated control.

^v Column numbers followed by the same letter are not significantly different at $P = 0.05$ as determined by LSD test.